
Case Study: Influenza Season Preparedness in the United States

Influenza Season Preparedness

Study population data to understand the relationship between of age, population size, and other factors, so that high influenza vulnerability groups or areas can be identified.

Excel data was imported into Tableau, where geospatial analysis, temporal analysis and forecasting were conducted. A storyboard in Tableau was created for the stakeholders.

OBJECTIVE

Assist medical staffing agencies in identifying high influenza morality areas so that they can help maintaining a staff-to-patient ratio of 1.1 in the hospitals

PROJECT DATA

- Influenza deaths by geography by CDC
- Population data set by US Census Bureau

METHODS APPLIED

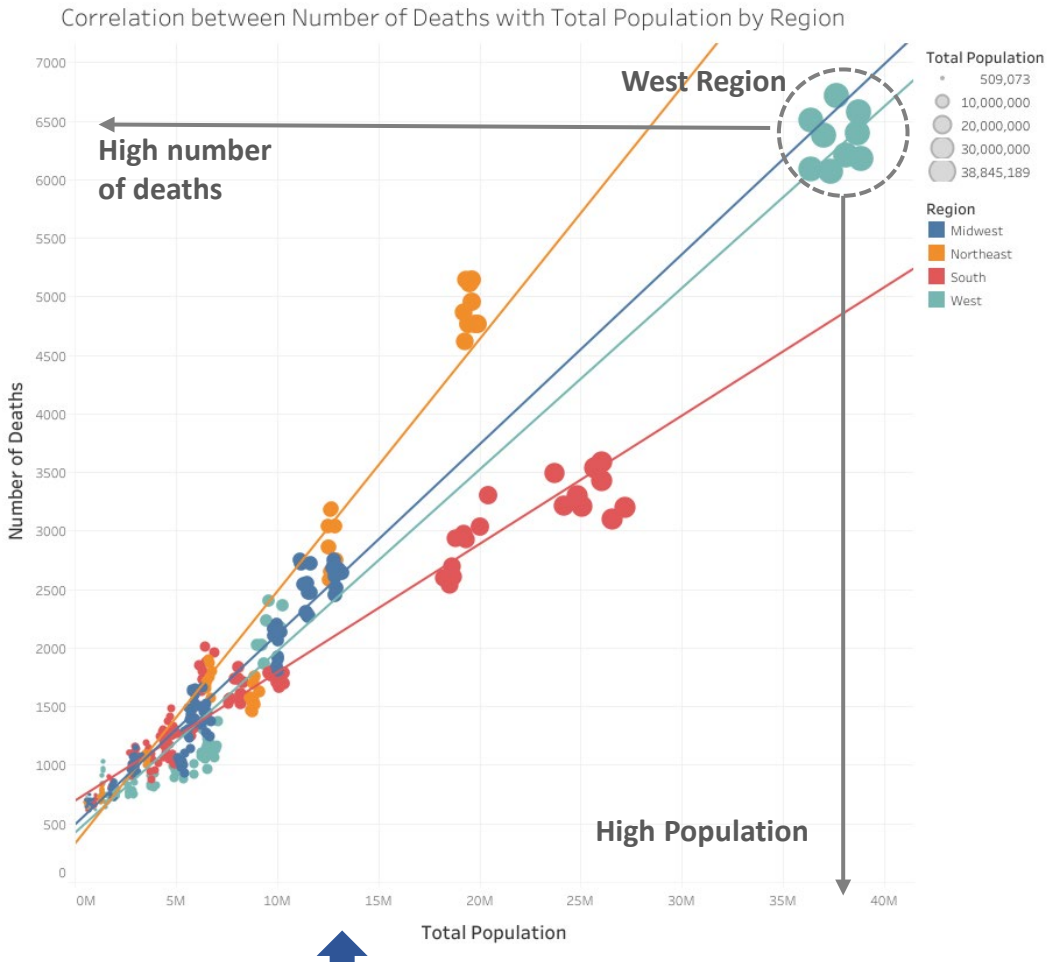
- Business Understanding
- Data Cleaning, Integration & Transformation
- Correlation Analysis
- Statistical Hypothesis Testing
- Tableau: Spatial & Temporal Analysis, Forecasting
- Tableau: Dashboard & Storyboard
- Video Presentation

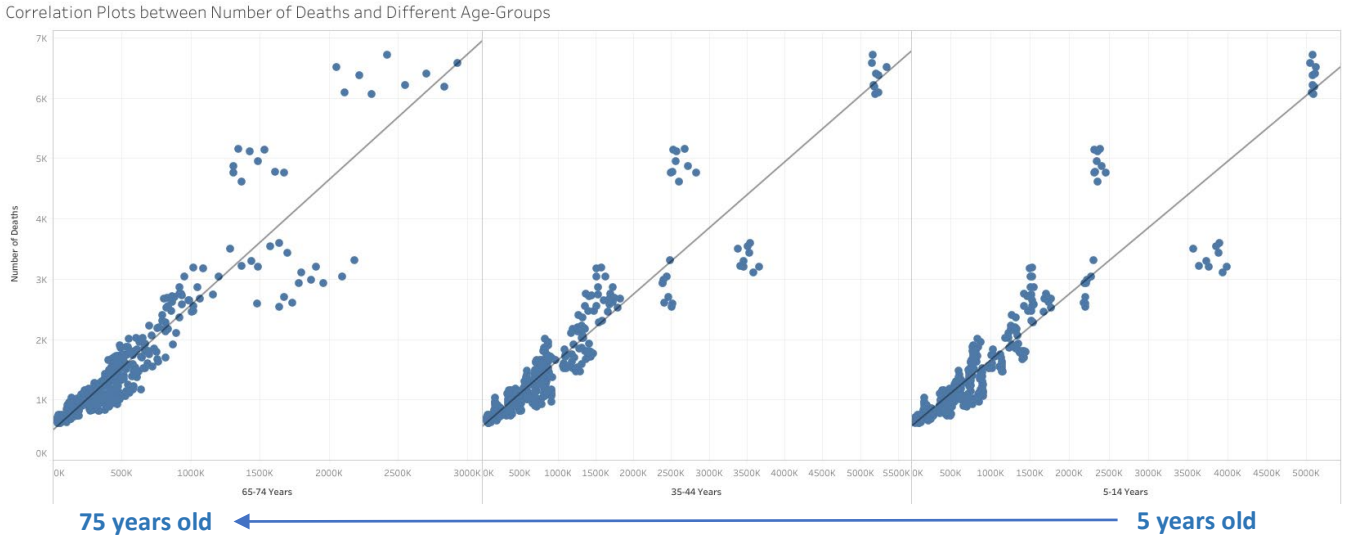
TOOLS

MOTIVATION

The motivation of the project is to help medical staffing agencies prepare hospitals and clinics for the coming influenza season. The objective is to keep the staff-to-patient ratio above 1.1 without any additional funds for hiring more staff.

ANALYSIS: Correlation Analysis



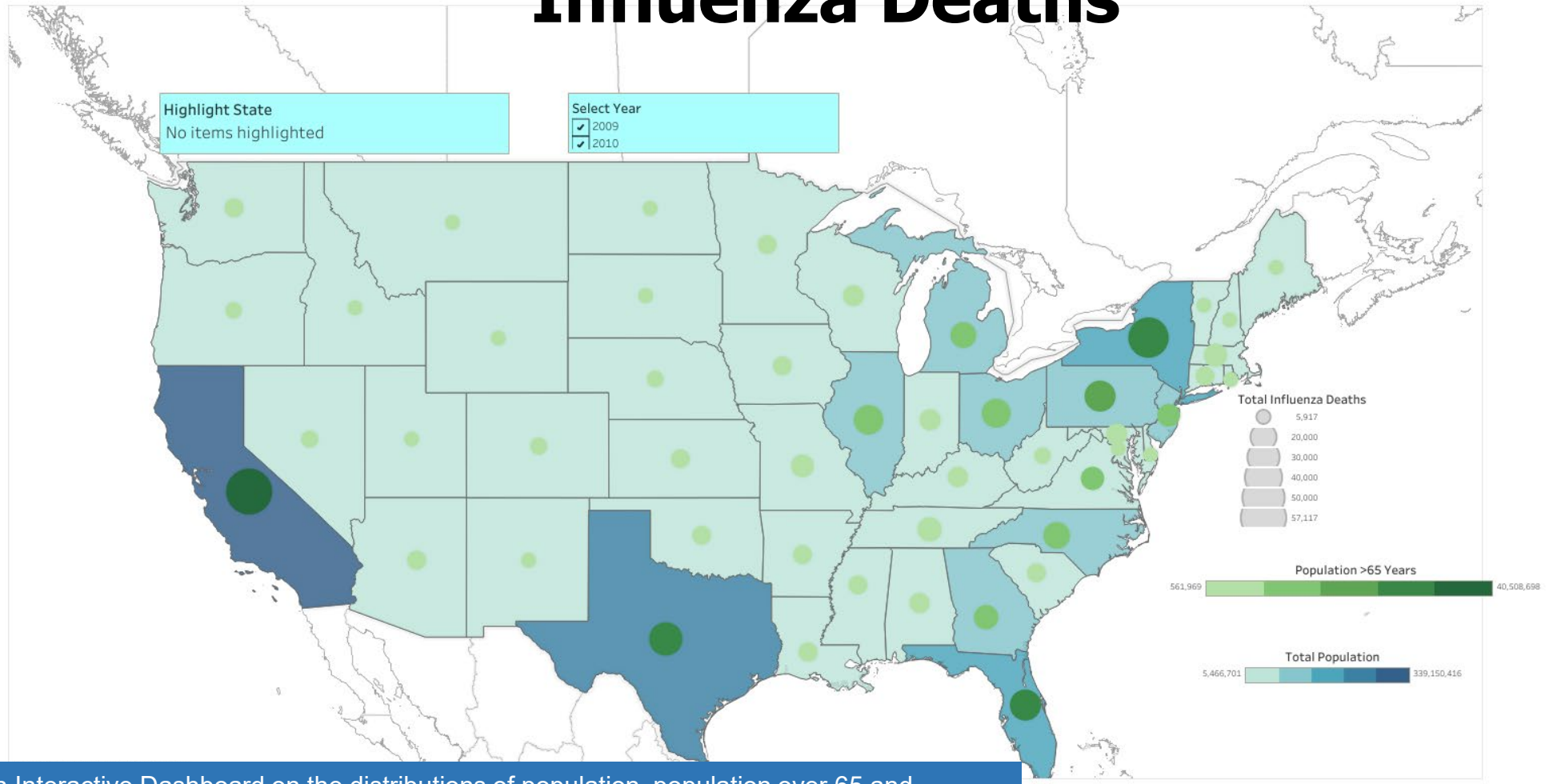


- Hypothesis testing on influenza mortality is higher for people over 65 than those under 65 via inferential statistics, giving a P-value less than the significant level of 0.05. There is a 95% certainty that influenza deaths for people over 65 are higher than those under 65.
- However, strong correlation coefficients are observed between influenza mortality across all age groups, from 5 to 75. Pearson's values range between 0.934 and 0.949.
- The correlation of +65 age with high influenza mortality exists, but it is not a unique relationship!

- Strong correlation coefficient is also observed between influenza mortality and high populated states, as shown in the West region.
- Besides focusing on +65 population as vulnerable population, attention should also be given to heavily populated states and densely populated cities.

Note: A storyboard can be accessed via Tableau

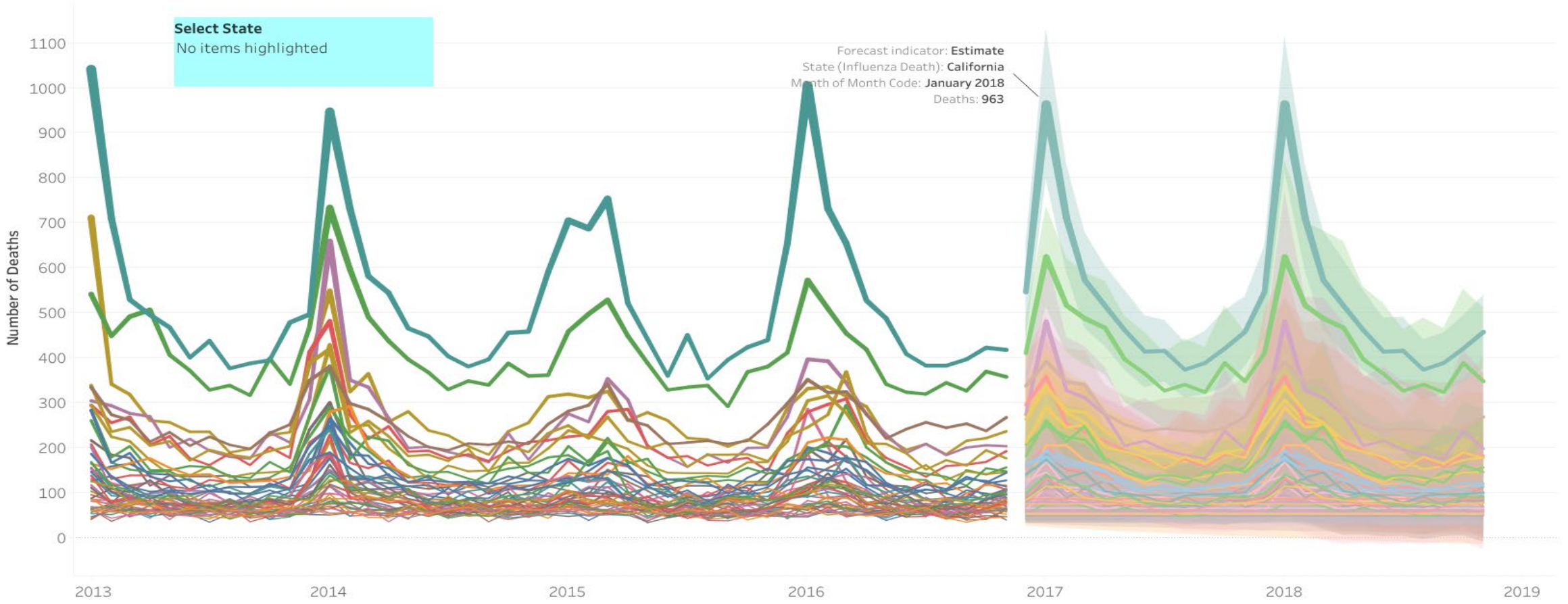
ANALYSIS: Distribution of Population and Influenza Deaths



- An Interactive Dashboard on the distributions of population, population over 65 and influenza deaths in America was created using Tableau.
- Number of influenza deaths (in circles) correlates positively with heavily populated states such as California, Texas, Florida, and New York. Those states also have higher number of people over 65.

Note: Storyboard can be accessed via Tableau

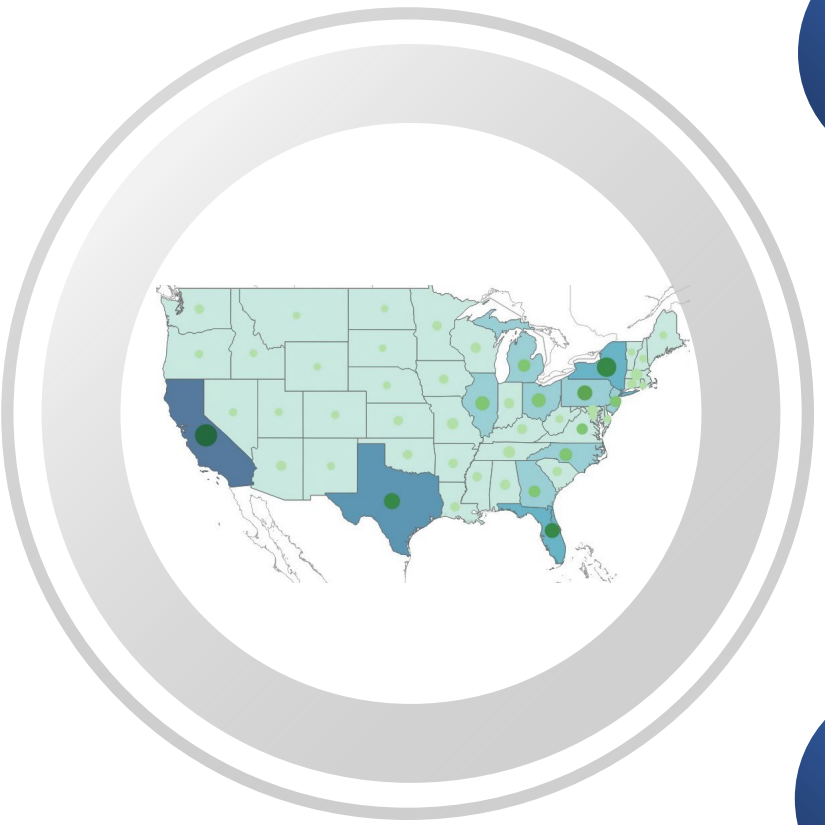
ANALYSIS: Forecasting of Influenza Deaths



- Using the exponential smoothing forecast model in Tableau, forecasting of influenza deaths shows that influenza mortality will peak again in the winter months of 2018 and 2019.
- Temporal analysis shows that seasonal patterns with high influenza deaths are especially strong in states where populations are high. Whereas, in low-populated states, the variation seasonal patterns (see lower portion of the line graph) are minimal.

Note: Storyboard can be accessed via Tableau

FINDINGS & NEXT STEPS



1

Focus on hospital preparations in heavily populated states.

- Priority 1: California, New York, Texas, and Florida
- Priority 2: Pennsylvania, New Jersey, Ohio, Michigan, North Carolina, Illinois, and Georgia

2

Collect the number of frontline staff at each participating hospital and create a real-time staff-to-patient ratio.

3

Collect and analyze population data in densely populated cities (>1 million inhabitants), to improve the forecast on influenza mortality at the city level.

RESTROSPECTIVE

What went well

The analysis and visualisation using Tableau went really well. I love the versatility and user-friendly of the tool.

The change of analysis perspective and the discovery of an insight on the relationships between high total population and high influenza mortality.

What didn’t go well

The data preparation took up too much time because I rushed into it before completed my exploratory data analysis and defined the appropriate analysis approach.

Lesson Learned

Conduct a proper exploratory data analysis, and define the appropriate approach before beginning the analysis.

“ A picture is worth a thousand words!”. Data visualisation couples with good storytelling is a powerful way to convey findings and insights